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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/911,995	07/24/2001	Sei-Hyung Ryu	5308-156	5240
20792	7590	10/06/2004	EXAMINER	
MYERS BIGEL SIBLEY & SAJOVEC			MUNSON, GENE M	
PO BOX 37428			ART UNIT	
RALEIGH, NC 27627			PAPER NUMBER	
			2811	

DATE MAILED: 10/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/911, 995

Applicant(s)

S. RYU ET AL

Examiner

G. MUNSON

Group Art Unit

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— The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address —

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE THREE MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- ☒ Responsive to communication(s) filed on 29 April, 2 September 2004
- ☐ This action is **FINAL**.
- ☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

- ☒ Claim(s) 1, 2, 4-6, 8-14, 83, 84, 87-89 is/are pending in the application.
- Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- ☒ Claim(s) 15, 21, 22, 26, 32, 38, 39 is/are allowed.
- ☒ Claim(s) 1, 2, 4-6, 8-14, 16-20, 23-25, 27-31, 33-37, 40, 41, 83, 84, 87-89 is/are rejected.
- ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- ☐ Claim(s) \_\_\_\_\_ are subject to restriction or election requirement

## Application Papers

- ☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.
- ☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner
- ☐ The specification is objected to by the Examiner.
- ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119 (a)-(d)

- ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119 (a)-(d).
- ☐ All ☐ Some\* ☐ None of the:
- ☐ Certified copies of the priority documents have been received.
- ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
- ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a))

\*Certified copies not received: \_\_\_\_\_

## Attachment(s)

- ☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 9/02/04
- ☐ Interview Summary, PTO-413
- ☐ Notice of Reference(s) Cited, PTO-892
- ☐ Notice of Informal Patent Application, PTO-152
- ☐ Notice of Draftsperson's Patent Drawing Review, PTO-948
- ☐ Other \_\_\_\_\_

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Examination is continued under 37 CFR 1.114.

Claims 4, 25, 27-31, and 33-37 are rejected under 35 U.S.C. 112, first and second paragraphs. Claim 4 appears misdescriptive, because "n-type shorting channels" 26' in Figure 7 do extend "beyond a periphery of the p-type silicon carbide regions" 20 as n-type "epitaxial" layer 27. Claim 25, that appears directed to the embodiment of Figure 7, is inconsistent with independent claim 12, which does not appear to read on Figure 7. In response, applicants should attempt to read claim 12 on Figure 7.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 4, 6, 10-12, 17-19, 23-25, 33-36, 40, 41, 83, 84 and 89 are rejected under 35 U.S.C. 103 as unpatentable over Okuno et al '822 and the Chung et al article (4/01), *of record*, considered together. The Chung et al article is considered as prior art under 35 U.S.C. 102(f) as requested by applicants in the paper filed 3 July 2003. Okuno et al (Figures 1, 4, 7C) show "drift" layer 2 (claims 4, 25), or for independent claims 1, 12 & 83, layer 2 plus the inherent subportion of layer 5 on layer 2; "p-type" regions 3a, 3b; "n-type" regions 4a, 4b; "n-type shorting channels" inherent subportions of layer 5 in regions 3a, 3b. The "n-type shorting channels" read on inherent subportions of layer 5 in regions 3a, 3b, and the "drift" layer reads on layer 2 plus the inherent subportion of layer

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5 on layer 2. For film 7, it would have been obvious to use "nitrided oxide" as suggested by Chung et al (pages 177-8; Figures 1, 2), in order to achieve higher mobility. From Chung et al (page 177, Figure 1), it would have been obvious to decrease "interface state density" comparable to that in Chung et al (claims 10, 17, 33).

Claims 8, 9, 13, 14, 16, 27-31 and 87 are rejected under 35 U.S.C. 103 as unpatentable, the evidence being Okuno et al '822 and the Chung et al article (4/01), as in the above rejection, further considered with Okuno et al '700 *of record*. It would have been obvious to use a thickness of layer 5 equal to or less than 0.3  $\mu\text{m}$ , as suggested by Okuno et al '700 (columns 3-4), and a dopant concentration of from less than  $1 \times 10^{15}$  to  $1 \times 10^{17} \text{ cm}^{-3}$ , as suggested by Okuno et al '700 (column 2) and Okuno et al '822 (column 2), in order to achieve depletion of layer 5.

Claims 5, 20, 37 and 88 are rejected under 35 U.S.C. 103 as unpatentable, the evidence being Okuno et al '822 and the Chung et al article (4/01), as in the above rejection, further considered with Fujii et al '231 *of record*. It would have been obvious to dope polysilicon gate electrode 8 as in Okuno et al '822 with a p-type dopant, as in Fujii et al (column 7), in order to achieve a low resistance for a contact.

Claims 15, 21, 22, 26, 32, 38 and 39 are allowed over the art of record.

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9/30/04



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